

Electrical Safety Procedure	
Enabling Policy Statement; Executive Owner; Approval Route:	Our Safety - Chief Operating Officer - Compliance Committee
Is the Procedure for internal use only (Non- disclosable)?	Disclosable
Associated Policy Statements:	N/A
Authorised Owner:	Director of Health and Safety
Authorised Co-ordinator:	Health and Safety Manager (Professional Services)
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Sub documentation:	

Approval History

Version	Reason for review	Approval Route	Date
1.0	Reviewed and updated (including in accordance with new Policy Framework 2022). Replaces Electrical Safety Policy (Version 2.0, dated October 2018).	Compliance (Health, Safety and Wellbeing Committee)	1 October 2024

1. Purpose

Electricity is the most useful source of energy throughout the world for lighting, power and data, and is used safely by millions of people on a daily basis. However, if not managed correctly, or misused, it presents a serious hazard that can cause injury or death. This document sets out the University Procedure for electrical safety.

2. Scope and Exceptions to the Procedure

The use of electricity is common to Estates & Facilities (E&F), Academic Faculties, staff, contractors, students and visitors to the University. This Electrical Safety Procedure is, therefore, applicable to everyone using electrical equipment in the University.

This Procedure includes arrangements for electrical power supplies, distribution, and connection of hard-wired installations including machinery and electrical equipment; selection and procurement of electrical equipment; equipment designed and built in the University; student projects; electrical equipment in flammable and explosive atmospheres; and visual inspection and testing of portable appliances.

This Procedure does not apply to the use of personal electrical equipment, or appliances or electrical equipment owned by staff, students and visitors, which is covered by separate University guidance (currently in development).

Exceptions to this Procedure also include electrical supply assets in the University belonging to the District Network Operator (UK Power Networks) which remain their property and under their control.

3. Definitions and Terminology

Electrical equipment – means anything used, intended to be used or installed for use, to generate, provide, transmit, transform, rectify, convert, conduct, distribute, control, store, measure or use electrical energy. This will include equipment commonly referred to as portable appliances. There is no legal definition of what constitutes a portable appliance but Health and Safety Executive (HSE) guidance states “a portable or movable electric appliance is any item that can be moved, either connected or disconnected from an electrical supply. Portable or movable items generally have a lead (cable) and a plug”. Extension leads, plugs and sockets, and cord sets that supply portable equipment are classified as portable equipment because they operate in the same environment and are subject to the same use as the equipment they serve. Portable equipment also includes appliances which have been fixed in position for security purposes (e.g., computer terminals in publicly accessible areas).

A system – means an electrical system in which all the electrical equipment is, or may be, electrically connected to a common source of electrical energy, and includes such source and such equipment.

High Voltage (HV) – Voltages over 1,000 Vac or 1,500 Vdc. The University HV networks are supplied at 11,000 volts ac 3-phase.

Low Voltage (LV) – Voltages below 1,000 Vac or 1,500 Vdc. The University LV systems are supplied at 415 volts ac 3-phase, and 230 volts ac single phase.

Extra Low Voltage (ELV) – Voltages below 50 Vac or 120 Vdc.

Reduced Low Voltage (RLV) – 110 Vac centre tapped to earth (55 Vac to earth).

Effects of Electrical injuries – the effects of electric injuries are well documented in HSE guidance.

These can be summarised as follows:

- Electric shock resulting from current flowing through the body can cause muscular spasm, heart stoppage, breathing paralysis, and deep burns.
- Overheating cables, equipment or appliances can cause burns, fire or explosion.
- Arcing can cause very rapid UV skin burns and blindness.
- Uncertified electrical equipment in hazardous areas may cause ignition of flammable or explosive atmospheres.
- Systems and machinery can operate erratically or run out of control due to electrical faults or electromagnetic interference, causing physical injury.
- Exposure to radio-frequency electrical energy can lead to deep-seated heating of body tissue, resulting in scars or organ damage.

The extent of electrical shock damage to the body depends on several physiological factors and environmental conditions, however, higher voltages present much greater risk of serious injury or death.

Suitable and safe – suitable and safe for use means deciding if a system or item of equipment is suitable and safe for use, based on due consideration of factors such as:

- the persons who will use the system or item of equipment
- the use to which the system or item of equipment will be put; and
- the environment in which the system, or item of equipment will operate.

Precautions in this context includes, but is not limited to:

- insulation, protection and placing of conductors
- earthing and other suitable precautions
- suitable electrical joints; and
- protection from excess currents.

Isolation – means the disconnection from every source of electrical energy in such a way that disconnection and separation is secure against deliberate or inadvertent reconnection.

Insulation – is a material whose intrinsic properties restrict the flow of electric current. It is essentially a barrier or a shield that separates electrical conductors without affecting or distorting the transmission of electrical power.

Live – equipment that is at a voltage by being connected to a source of electricity. Live parts that are uninsulated and exposed so that they can be touched either directly or indirectly by a conducting object are hazardous if the voltage exceeds 50 Vac or 120 Vdc in dry conditions and/or if the fault energy level is high.

Dead – means not electrically ‘live’ or ‘charged’.

CE Mark – the letters ‘CE’ appear on many products that are traded on the single market in the European Economic Area (EEA). The CE marking is required for many products, and:

- Shows that the manufacturer has checked that these products meet EU safety, health or environmental requirements.
- Is an indicator of a product’s compliance with EU legislation.
- Allows the free movement of products within the European market.

UKCA – For companies selling or supplying electrical equipment to the UK market, compliance with the Electrical Equipment (Safety) Regulations is necessary for UKCA marking. UKCA came into effect

on 31st December 2020, and is the new mandatory mark for certain equipment, machinery and products sold in Great Britain (England, Wales and Scotland). The Electrical Equipment (Safety) Regulations apply to electrical equipment designed for use within certain voltage limits and associated health and safety measures.

Competent person – a competent person has the necessary skills, knowledge, attitude, training and experience to undertake the role effectively.

The scope of the knowledge and experience needed includes:

- adequate knowledge of electricity and adequate experience of electrical work
- adequate understanding of the system to be worked on and practical experience of that type of system
- an understanding of the hazards which may arise during the work and the precautions to that need to be taken, and
- an ability to recognise at all times whether it is safe for work to continue.

Training – is equipping staff, students (and others where the University has a duty of care) with the relevant skills to deal appropriately with a given health and safety situation.

Briefing – is informing such persons of relevant knowledge in relation to health and safety.

4. Procedural Principles

4.1. Commitment

The University will manage, so far as reasonably practicable, all electrical systems and electrical equipment falling under its control in such a manner as to minimise the risk to any person using such systems. The University will achieve the requirements of this Procedure by putting measures in place to secure, so far as is reasonably practicable that:

- All electrical systems and equipment are suitable and safe for their intended use.
- Suitable precautions are taken to prevent danger arising from the use of electrical systems and equipment.
- All electrical systems and equipment are subject to a suitable risk-based regime of inspection, testing and maintenance. This requirement is limited to circumstances where this is necessary to ensure that systems or equipment remains safe.
- All electrical systems and equipment shall have a suitable means of cutting off the electrical power and isolating it.
- Electrical systems or equipment which are decommissioned, dismantled or abandoned are made dead and isolated from every source of electrical energy.
- Work on live electrical systems or equipment must only be performed in exceptional circumstances. Work on or near live electrical conductors (other than one suitably insulated) is not permitted unless:
 - It is unreasonable in all the circumstances for it to be dead; and
 - It is reasonable in all circumstances for the work to take place while the conductor is live, and
 - Before any live electrical work is undertaken, the operation is subject to a risk assessment and suitable precautions implemented before work commences to prevent injury, including a sanction to work and/or permit to work, and
 - Such work is only undertaken by persons competent to do so.

4.2. Arrangements

In order to meet the above objectives, the University will adopt the following arrangements:

- Clearly define the organisational arrangements for achieving compliance (see roles and responsibilities section of this Procedure).

- Assess and manage the risks associated with working with or near electricity and electrical equipment, implementing any controls measures identified which, where necessary, may include safe systems of work such as permits to work or safe isolation procedures.
- The High Voltage networks shall be managed by E&F electrical engineers in accordance with the HV Management Plan, with all work carried out by HV Approved Contractors. High Voltage systems must only be switched or worked on by Authorised Competent Persons.
- Low voltage fixed wiring installations shall be designed, installed, maintained, and inspected in accordance with the statutory Regulations, British Standards, the Wiring Regulations, and established practice of the UK electrical industry. Fixed wiring installations must only be worked on by qualified electricians and engineers.
- Electrical equipment procured by the University for standard use in academic buildings and residences shall be CE or UKCA marked, compatible with the UK supply, and comply with the Electrical Equipment (Safety) Regulations 1994. Specialist equipment for use in explosive atmospheres, radiology and medical purposes, and lifts shall be supplied in compliance with relevant Regulations. Bespoke or innovative equipment for research which falls outside of international or national standards must nonetheless comply with the fundamental safety requirements of the Regulations.
- Electrical equipment made, repaired or modified in the University must comply with the Electrical Equipment (Safety) Regulations 1994 and its design, safety and operation documented and certified safe for use by a competent electrical engineer.
- Student projects encompassing electrical power must be supervised by Academic Tutors and Laboratory Managers. Projects are normally set at safer extra low voltage levels, but any potentially hazardous projects will be subject to risk assessment.
- Portable appliances under the direct management of the University shall be inspected and tested according to HSE and IET guidelines, as well as taking reasonable measures to ensure that third parties (including contractors) only use portable appliances that are safe and have been appropriately tested and/or inspected.
- Fixed electrical equipment in academic buildings, plant rooms and residences shall be maintained in accordance with a planned preventative maintenance routine.
- Power tools for use on construction sites shall either be cordless or supplied from a reduced low voltage supply.

4.3. High voltage networks

The University is supplied at High Voltage and the 11kV distribution network extends to substations in Stag Hill and Manor Park. System details and drawings of the HV distribution systems are held and maintained by E&F.

The HV networks are managed by the University electrical engineers in accordance with the HV Management Plan. Inspection and testing of the 11kV distribution system and sub-stations is carried out by specialist HV contractors appointed by the University. This contract is managed by E&F.

HV substations are identified with warning notices and kept locked by E&F. Access to substations is controlled by either Permit to Access or Permit to Work. Only the Principal Electrical Engineer, Authorised Persons and engineers of the HV Approved Contractor are allowed into the HV substations unless accompanied. High Voltage systems must only be switched or worked on by HV Authorised Persons and Competent Persons.

4.4. Fixed distribution systems

The low voltage fixed distribution systems at the University are designed, installed and maintained in accordance with BS7671:2018 the IET Wiring Regulations. E&F are accredited by the National Inspection Council of Electrical Installation Contractors as a conforming body for inspection and testing, with the Principal Electrical Engineer as the principal duty holder and a Qualified Supervisor who carries out inspections and maintains the documentation. The frequency of inspection and

testing is carried out to Guidance Note 3 of the Wiring Regulations for educational establishments every 5 years. The schedule of testing and the test records are held by E&F.

LV substations are identified with 415V warning notices, kept locked by E&F and access is controlled by Permit to Work. Fixed wiring installations must only be worked on by qualified electricians and engineers in accordance with established safe systems of work.

Hard-wired plant, machinery and equipment is permanently connected to the electrical supply at 415 volts ac 3-phase. All plant and machinery will be fitted with local isolators as required in the Wiring Regulations.

4.5. Portable appliances

Portable appliances must be formally inspected and tested at intervals and must display a test label indicating the test date. New appliances should be visually inspected by end users for obvious signs of damage before being put into service and, where required, registered for future portable appliance testing.

The frequency of testing of portable appliances varies according to risk assessment depending upon the class of equipment and the environment in which it is used; in accordance with Table 1 of the Code of Practice for In-service Inspection & Testing of Electrical Equipment, [HSE guidance HSG107 Maintaining Portable Electrical Equipment](#), and [INDG236 Maintaining Portable Electric Equipment in Low-risk Environments](#).

Portable appliance testing must be carried out by specialist approved contractors, staff or co-opted students who have attended recognised training.

Any portable appliance that fails either a visual inspection or a formal test must be disconnected, withdrawn from service, marked as 'Unsafe – Not to be used', and either made safe by a competent electrician or disabled and disposed of according to University waste disposal requirements.

E&F carry out portable appliance testing for central departments and residences. Faculties arrange for portable appliance testing of their own equipment.

4.6. Procurement of equipment

Standard electrical equipment procured or leased new shall be CE or UKCA marked for use within the EU, compatible with the UK supply voltage and frequency, and comply with the Electrical Equipment (Safety) Regulations 1994.

Specialist equipment for use in explosive atmospheres, radiology and medical purposes, and lifts shall be supplied in compliance with relevant Regulations.

Bespoke or innovative research equipment, for which international or national standards do not yet exist, must nonetheless comply with the fundamental safety requirements of the Regulations. The University in conjunction with suppliers of the equipment must satisfy themselves as to the compliance of the electrical equipment with the Regulations. Second hand equipment does not necessarily have to be CE or UKCA marked but must be suitable and safe to use.

4.7. Design, build, repair and modification

Electrical equipment, apparatus or devices made in the University must comply with the Electrical Equipment (Safety) Regulations 1994 but does not require CE or UKCA marking for use within the University. The design, safety and operation of the equipment must be documented, reviewed and certified safe for use by a competent electrical engineer. Equipment under 50 Vac or 75 Vdc is exempt.

Repairs carried out in the University must be undertaken appropriately according to the relevant British Standard with particular attention to insulation, electrical protection (fuses, etc.) and earthing. Where possible, repairs should be carried out in dedicated workshops by competent persons.

Modifications to equipment need to be assessed by a competent engineer to determine whether such modifications have introduced risks or hazards which were not present in the original design, and act accordingly.

4.8. Student projects

Student projects using or generating electrical power are supervised by Academic Tutors and Laboratory Managers. Any projects above safe extra low voltage levels or with particular hazards such as exposed parts, stored energy, radiated electromagnetic fields, or emitting laser energy shall be subject to a risk assessment by a competent electrical engineer and/or radiation specialist.

4.9. Electrical equipment in hazardous areas

Hazardous areas (where an explosive atmosphere may occur due to flammable gases or volatile liquid vapours) are classified according to BS EN 60079-10-2015. Electrical equipment for installation or use in hazardous areas must conform to the necessary standards Ex i (intrinsically safe), Ex d (flameproof), or Ex n (low temperature non-sparking) according to the area classification Zone 0, Zone 1 or Zone 2. Hazardous area installations and electrical equipment brought in to facilitate work within these areas must be approved by a competent electrical engineer.

Furthermore, potentially hazardous areas such as laboratories and workshops often contain advanced equipment utilising specific voltage supplies, and these will be subject to risk assessment and the implementation safe systems of work.

4.10. Construction site tools

The preferred system for use on construction and refurbishment sites around the University is to use cordless battery powered tools, or those that operate from a reduced low voltage supply with automatic disconnection comprising a 110 Vac centre-tapped to earth (CTE) supply transformer so that the maximum voltage to earth does not exceed 55V.

4.11. Maintenance

Electrical equipment in academic buildings is maintained by the Faculties. HV and LV distribution equipment, plant and machinery in plant rooms is maintained by E&F.

Lighting, power and domestic equipment such as ovens, hobs and irons in the University residential blocks are maintained by E&FM. The frequency of maintenance and inspection and testing routines are defined in a planned preventative maintenance system.

Damaged or defective equipment must be repaired or replaced. Old or obsolete equipment will be subject to planned replacement based on age and condition, as determined by a competent electrical engineer.

4.12. Disposal

Equipment must be disposed of in accordance with the EU Waste Electrical and Electronic Equipment (WEEE) Directive and where applicable the Hazardous Waste Directive. Refer to the University H&S document "A – Z guidance for Hazardous Waste Management" for guidance on disposal of electrical goods.

4.13. Responsibilities

In meeting its statutory obligations, the University has instituted the following organisational arrangements:

- 4.13.1. Estates & Facilities Senior Electrical Engineer (who reports to the Head of Maintenance) is responsible for ensuring:
- Fixed wiring tests to the University buildings are carried out at frequencies in line with Chapter 65 of BS7671:2018 and Table 3.2 of IET Guidance Note 3 and that suitable records, including relevant certification, in respect of fixed wire testing are kept and maintained up to date.
 - Electrical systems or equipment within their control are suitable and safe for use. This includes ensuring that suitable precautions are implemented to prevent danger.
 - Electrical systems or equipment within their control are subject to a suitable regime of inspection, testing and maintenance (including Portable Appliance Testing) to ensure they remain safe to use. This requirement is limited to circumstances where this is necessary to ensure safety.
 - Electrical systems or equipment within their control are disconnected and isolated before any work is conducted on or near the conductors, unless it is planned that live electrical work will be performed.
 - Any planned live electrical work within their control is only performed if the criteria set out in this Procedure are met. This includes ensuring that the work is fully assessed, and suitable precautions implemented before work commences including, where necessary, permits to work.
 - Any work on electrical systems or equipment within their control is carried out by those competent to do so. Suitable records, including relevant certification, in respect of such competency is kept and maintained up to date.
- 4.13.2. Heads of Department/School/Directorates are responsible for ensuring that:
- Risks associated with working with or near electricity and electrical equipment are assessed and managed.
 - Electrical equipment or systems under their control (including electrical equipment issued for use at another location, such as an employee's home) are:
 - Suitable and safe for use. This includes ensuring that suitable precautions are implemented to prevent danger.
 - Subject to a suitable regime of inspection, testing and maintenance (including Portable Appliance Testing) to ensure they remain safe to use. This requirement is limited to circumstances where this is necessary to ensure safety.
 - Disconnected and isolated before any work is conducted on or near exposed conductors. There should be appropriate measures in place to prevent the system or equipment being re-energised whilst works are being carried out.
 - Sufficient competent persons are appointed to assist them with the execution of their responsibilities and agreeing the arrangements for the involvement in any work, along with such other measures necessary for the execution of this role holder's duties.
 - Any work carried out on electrical equipment or systems is only carried out by those people with the necessary competence (training, skills and experience) to do so safely under appropriate supervision.
 - Members of their School/Department/Directorate, or any contractors that they control, do not carry out any work on building electrical services without the express consent of the Head of Maintenance (Estates & Facilities) or E&F Senior Electrical Engineer.

4.13.3. Electrical Technicians (Estates & Facilities) are responsible for:

- Working in accordance with control measures outlined in the risk assessment and other safe systems of work, which may include permits to work.
- Undertaking any training deemed necessary by the University.
- Using and maintaining any work equipment in accordance with any information, instruction or training.
- Using and maintaining Personal Protective Equipment (PPE) in accordance with any information, instruction or training.
- Immediately reporting any accidents or near misses to their manager/supervisor and via the University incident reporting system.
- Immediately reporting defects in equipment used (including PPE) and remove from use.

Note: The Faculties also have competent electrical technicians/engineers among their academic and technical staff who supervise student projects; design, build, repair and modify equipment; and carry out Portable Appliance Testing.

4.13.4. Director of Health and Safety is responsible for:

- The provision of advice and guidance on the application of this Procedure.
- Monitoring compliance with the requirements of this Procedure through the health and safety audit programme.
- Where necessary, liaising with the enforcement authorities.
- Reporting incidents under RIDDOR.

4.13.5. HV Approved Contractor is responsible for:

- Operation, maintenance and switching of the University HV networks.
- Working in accordance with their own safety procedures whilst working on the University HV networks.

4.13.6. Individual members of staff and students must:

- Report any wear or damage to electrical equipment, such as damage to plugs, sockets, switches, flexible power cords and equipment which may expose people to danger by logging an E&F maintenance request.
- Ensure that any personal equipment brought onto campus complies with European and British Standards (CE or UKCA marked) and is in a safe condition to use.
- Not, under any circumstances, carry out repairs or alterations to electrical equipment or systems unless competent and authorised to do so.

4.14.7. Compliance Management Group

The purpose of the Group is to contribute to the development and direction of health and safety compliance management across the University estate. The Group monitors health and safety performance in respect of defined compliance areas, including electrical safety, and provides a forum for obtaining input from relevant departments on such compliance matters. The Terms of Reference of the Group can be viewed [here](#).

5. Governance Requirements

5.1. Implementation: Communication Plan

The procedure will be available via the University procedures webpages. The procedure is communicated through specific, relevant training – including local inductions.

The Compliance Management Group will be notified, and information disseminated through line management. Faculty Health and Safety Committees will also be informed.

This Procedure and relevant supporting documentation are also published on the University Health and Safety intranet site.

5.2. Implementation: Training Plan

Communicated through specific, relevant training – including the University essential Health and Safety training, local inductions, and departmental toolbox talks.

Information, instruction and training requirements for those persons working on electrical systems or equipment are wide-ranging and will be determined through a competency needs assessment conducted at Faculty/Directorate level.

Training and briefing will be made available in a range of formats according to the needs of the trainee and different groups of staff, students, and others.

5.3. Review

This Procedure is regularly reviewed by the Director of Health and Safety. Minor changes will be reviewed by the Compliance Management Group and approved by the Compliance (Health, Safety and Wellbeing) Committee. Major reviews will also be reviewed by the Compliance management Group, prior to submission to Compliance (Health, Safety and Wellbeing) Committee for approval, and if required, noted at Executive Board.

This procedure will be reviewed every three years or in response to any relevant changes to Legislation, if sooner. The Health and Safety Consultative Committee will be consulted during the review process, as required.

5.4. Legislative Context and Higher Education Sector Guidance or Requirements

5.4.1. Applicable Legislation

This procedure complies with the requirements of the Health and Safety at Work Act 1974 and other legislation such as:

- The Management of Health and Safety at Work Regulations 1999.
- Electricity at Work Regulations 1989, and memorandum of guidance.
- Electrical Equipment (Safety) Regulations 1994.
- Provision and Use of Work Equipment Regulations 1998 (PUWER)
- Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (RIDDOR).

5.4.2. Legislative Context

This procedure sets out to comply with the required 'duty of care' placed upon the University. Under Health and Safety Law a 'duty of care' is generated between organisations and individuals when carrying out activities that could foreseeably cause harm.

The primary duty of care is owed through the employer-employee relationship in which the employer owes a duty of care to ensure that work activities that could result in harm to the employee are assessed and controlled. That duty of care is put into practice by the line management responsibilities as set out in the hierarchy of the organisation.

This duty of care cannot be delegated away; instead, the act of delegation must be accompanied by a realistic and workable system of monitoring or supervision to ensure that the delegated task has been adequately implemented (i.e., the responsibility is not met by giving directions; it is met when those directions have been confirmed as carried out). The result is a cascade of delegated accountability that runs through the organisation via the line management network, accompanied by a system of monitoring, supervision, and feedback.

The duty of care extends to assurance that services provided by others (be they another

department of the University or contractors) are undertaken safely. The level of assurance required should be commensurate with the risk of the activity.

In addition, anyone carrying out an activity owes a duty of care to anyone who may be put at risk by the activity, such as students, staff, and visitors.

5.5. Sustainability

This Procedure has no impact on carbon emissions or on energy consumption.

6. Stakeholder Engagement and Equality Impact Assessment

6.1. An Equality Impact Assessment was completed on **17/04/2024** and is held by the Authorised Co-ordinator.

6.2. Stakeholder Consultation was completed, as follows:

Stakeholder	Nature of Engagement	Request EB Approval (Y/N)	Date	Name of Contact
Governance	Development and creation of this procedure v1.0	N	03/07/2024	Kelley Padley, Governance Officer
Members of the Compliance Management Group	Development and creation of this procedure v1.0	N	03/07/2024	Members of this Committee.
Health and Safety Consultative Committee	Development and creation of this procedure v1.0	N	03/07/2024	Jo McCarthy-Holland, Equality and Diversity Advisor.
EF&CS Health and Safety Management Group	Development and creation of this procedure v1.0	N	03/07/2024	Members of this Management Group
Sustainability	Development and creation of this procedure v1.0	N	03/07/2024	Martin Wiles, Head of Sustainability.
Equality, Diversity and Inclusion	Development and creation of this procedure v1.0	N	03/07/2024	Jo McCarthy-Holland, Equality and Diversity Manager.